

Review 20 volumes

1. sketch area being rotated
2. sketch rectangle: choose horz. or vert. dy or dx
3. sketch slice (rotate rectangle)
4. set up integral

disk $\int_a^b \pi r^2 dx$ or $\int_c^d \pi r^2 dy$

washer $\int_a^b \pi R^2 - \pi r^2 dx$ or $\int_c^d \pi R^2 - \pi r^2 dy$

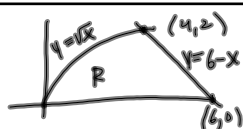
shell $\int_a^b 2\pi rh dx$ or $\int_c^d 2\pi rh dy$

known cross section $\int_a^b \text{area of slice} dx$ or $\int_c^d \text{area of slice} dy$

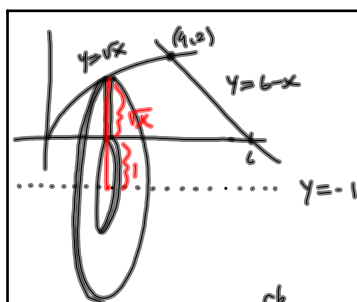
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Apr 10-8:16 AM

Ex. 1



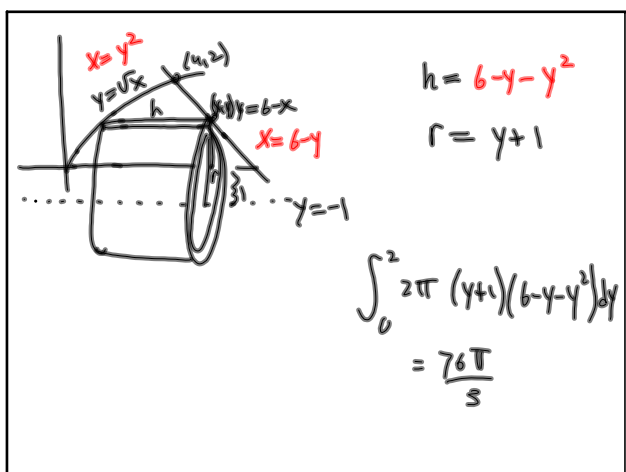
- Rotate R about $y = -1$. Find the volume.
- R is base of a solid. Cross sections \perp to the x-axis are rectangles with height $= 2y$. Find volume.



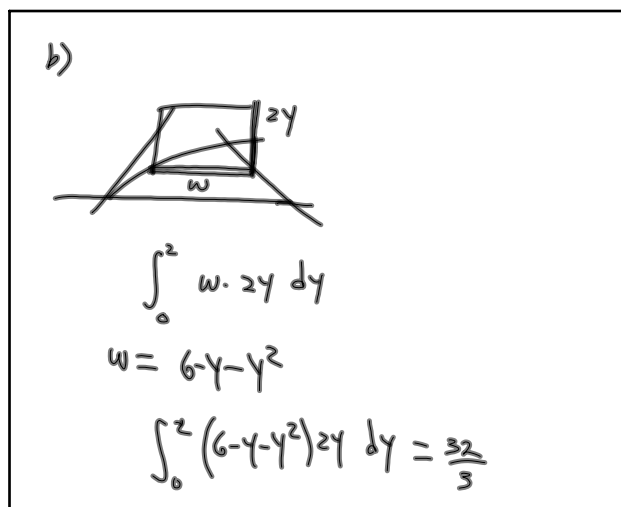
$$\int_0^4 \pi (\sqrt{x}+1)^2 - \pi \cdot 1^2 dx + \int_4^6 \pi (6-x+1)^2 - \pi \cdot 1^2 dx = \frac{76\pi}{3}$$

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Apr 10-8:27 AM



Apr 10-8:31 AM



Apr 10-8:36 AM